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APPLICATION NUMBER: ***60/448,635***
FILING DATE: ***February 18, 2003***

PRIORITY DOCUMENT
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60448635 .024P

PTO/SB/16 (10-01)
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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No. ET623948655US

J1040 U.S. PTO 60/448635

INVENTOR(S)		
Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Ken	Bowman	Delta, Canada

☐ *Additional inventors are being named on the* Ø *separately numbered sheets attached hereto*

TITLE OF THE INVENTION (500 characters max)

ROOFING SYSTEM

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ENCLOSED APPLICATION PARTS *(check all that apply)*

☑ Specification *Number of Pages* 9 ☐ CD(s), Number _____

☑ Drawing(s) *Number of Sheets* 15 ☐ Other (specify) _____

☐ Application Data Sheet. See 37 CFR 1.76

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

☑ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check or money order is enclosed to cover the filing fees

☑ The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number: 501841

☐ Payment by credit card. Form PTO-2038 is attached.

FILING FEE AMOUNT ($): $80.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☑ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are: _____

Respectfully submitted,

SIGNATURE _____

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Date 02/18/2003

REGISTRATION NO. *(if appropriate)* 43431

Docket Number: 26572-0001

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

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Roofing System

Overview

The present invention relates to a roofing system that includes high-profile panels made from recycled rubber tire crumb and recycled industrial polymers such as polyethylene and polypropylene or other virgin plastics.

The panels incorporate a longitudinal locking mechanism along the length of their front and back edges that allows each panel to lock to its neighbor to produce a weather-resistant closure. This longitudinal locking mechanism allows the panels to be continuously staggered to avoid any repetition of pattern that would be unappealing to the eye of the beholder. The portion of the longitudinal locking mechanism along the rear edge of a panel protrudes upward, while the portion of the longitudinal locking mechanism along the front edge is located on a panel's underside and creates a cavity into which the rear edge of an adjacent can panel latch. This longitudinal locking mechanism allows the panels to expand and contract and tighten with exterior forces, such as wind.

Fasteners, for example nails or screws, may be used to fasten each panel to a substrate along its rear edge through a nailing flange in marked locations. All such fasteners are protected by the longitudinal locking mechanism against exposure to the elements, as will be described in greater detail below.

The panels also have transverse locking mechanisms on each side, adapted so that adjacent panels can be locked together in a side-to-side fashion. This transverse locking mechanism might be a hook and lap arrangement, which offers a tight lock and easy alignment of the panels during installation.

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15 DRAWING SH

When locked together, the panels offer protection against wind, rain and other elements of nature. Built in cavities along the front edge diffuse wind-driven rain pressures and resist the entry of rain along the front edge of the panel. If rain were to get past these cavities, it would be quickly diffused when it reached the longitudinal locking mechanism and would drain naturally away.

Additionally, the panels have supports built into the under surface that evenly distribute forces to the substrate when the panels are walked upon.

The undersurface is also specially designed with an integrated venting system that allows for continual air flow under the panel, reducing the possibility for moisture build up from underneath which is the common source of wood rot or mold.

These panels can be decorated to look like wood cedar shakes, concrete tile, Spanish tile, Italian tile, Slate and other textures on the top exposed side. Many other designs may be imparted to the upper exposed surfaces as may be required. The panels can be colored to numerous synthetic colors to emulate the colors of nature, for example light grays or black.

The panels' polymer and rubber matrix makes them flexible and gives them a high coefficient of expansion and contraction. Being composed of recycled materials, the panels may be an environmentally friendly and cost-competitive alternative to natural products. Additionally, the panels are themselves recyclable; if ever a panel has to be recycled, it can simply be reground and reprocessed. The durability and resistance to ultra-violet radiation of the polymer matrix offer an extended life expectancy of about 50 years.

The panel design allows for easy application, thus cutting labor costs and installation times. Because each panel contains an assembly of three to five pieces of exposed texture,

they are easy to handle and install. For example, the panels can be made about 16 inches by 40 inches, with an exposed surface of about three square feet and a thickness of about 1.8 inches at the thickest protrusion.

While the most common usage of the panels is for roof applications but they may be also used for other applications, for example as siding.

Accessory caps may be used on roof applications at the peaks or on gable application to cover any change in direction where there are exposed edges. These accessory caps incorporate similar design features.

Brief Description of the Figures

Figure 1 is a top view of a panel embodying aspects of the present invention.

Figure 2 is a bottom view of the panel of Figure 1.

Figure 3 is an end view of the panel of Figure 1, detailing the longitudinal locking mechanism.

Figure 4 is a front view of the panel of Figure 1.

Figure 5 is a view of the panel of Figure 1, detailing the transverse locking mechanism.

Figure 6 is a front view of the panel of Figure 1, with its bottom surface exposed to view.

Figure 7 is a top view illustrating three panels, of the sort illustrated in Figure 1, connected together.

Figure 8 is a bottom view of the panels of Figure 7.

Figure 9 is an oblique top view of the panels of Figure 7.

Figure 10 is an oblique bottom view of the panels of Figure 7.

Figure 11 is a shaded oblique top view of the panels of Figure 7.

Figure 12 is a shaded oblique front view of the panels of Figure 7.

Figure 13 is a shaded oblique bottom view of the panels of Figure 7.

Figure 14 is a shaded top view of the panels of Figure 7.

Figure 15 is a shaded top and bottom detailed view of the longitudinal locking mechanism of the panels of Figure 7.

Detailed Description of a Specific Embodiment

Figure 1 is a top view of a roofing panel embodying aspects of the present invention. The panel includes decorative elements 5, which may be characterized by simulated textures of wood cedar shakes, slate, stone, brick or other tile pattern effects. Although each panel is a unitary member, the decorative elements 5 are separated by gaps 6 to give the appearance of discrete tiles affixed adjacently.

The decorative elements 5 are staggered so that their frontal faces 13 form an irregular pattern. This irregular pattern avoids the artificial appearance that aligned frontal faces 13 would present. The frontal faces 13 of the decorative elements 5 may also have a pattern imparted to them to provide integrity with the pattern imparted to the top portion of the decorative elements 5.

As seen in Figures 2, 3, 7, 8, 10, 14, and 15, the bottom surface of the decorative elements 5 proximate to the frontal faces 13 is adapted to contact to the top surface of adjacent panels to create a first point of protection for the roof system against elements such as water, wind or wind-driven rain.

As seen in Figures 2, 8, 10, and 13, additional resistance to these elements is provided by a cavity 14, which runs strategically along the full length of the frontal faces 13 of the panel on the bottom. Each such cavity 14 creates a vacuum break which disrupts any wind driven rain or water that may pass along the bottom face of the panel, thereby resisting the hazardous effect such elements could potentially cause and draining the water naturally away.

As best seen in Figures 3, 4, and 15, still further resistance to these elements is provided by a longitudinal locking mechanism as detailed in section B-B of Figure 3.

As seen in Figures 1, 7, 11, and 14, recessed indicators 1 are set along the back edge of the panels to show the preferred location where fasteners may be inserted to affix the panel to an existing substrate or structure. These indicators 1 are situated behind a male protrusion 2 which runs the full length of the panel and forms one half of the longitudinal locking mechanism that runs along the back of the panel. This male protrusion 2 locks with a corresponding female cavity 12 which, as best illustrated in Figures 2, 3, 8, 10, 13, and 15, runs the full length of the underside of the front of the panel. The longitudinal locking mechanism created by the male protrusion 2 and female cavity 12 creates a water-resistant joint, which resists wind-driven rain or other elements from penetrating under the panels.

Figures 3/15, Detail D show the manner in which the male protrusion 2 and female cavity 12 make contact. Figures 3/15, Detail B show a close-up view of the male protrusion 2 and Figures 3/15, Detail C show a close up view of the female cavity 12. This longitudinal locking mechanism adds strength to the panel and increases in strength with any exterior force that causes lift, such as wind.

The longitudinal locking mechanism as best shown in Figures 3/15, Detail D, allows for a continuous adjustment of adjacent rows of interlocking panels to prevent the proliferation of any ongoing noticeable repetitive design which may have a negative appeal to the look of the visual elements of the panels when used in a system.

The longitudinal locking mechanism as shown in Figures 3/15, Detail D resists the penetration of the elements, such as wind or rain. This longitudinal locking mechanism also protects the fasteners that are used to secure the panels to the substrate at recommended locations that are indicated by indicators 1.

As best seen in Figure 5, a recessed water reservoir 3 is located along the end of the panel adjacent to the male protrusion 2. An additional male protrusion 4 forms one half of a transverse locking mechanism that is incorporated at each end of the panel to resist moisture penetration of the panels when used as a system. This transverse locking mechanism provides yet further protection against damaging water or moisture ingress into the underside of the complete panel system.

As best seen in Figure 3, Detail D and Sections A-A and B-B, a water stop 16 provides additional protection against moisture inhabitation of the underlying surface area of the panels. This water stop 16 runs the full length of the back edge of the panel.

The transverse locking mechanism is formed into the upper and lower portions of each panel in the form of an interlocking joint comprised of the additional male protrusion 4 and an additional female cavity 11, as best seen in Figure 5, Details F and H. For greater clarity, in this embodiment the additional male protrusion 4 is located on the right hand edge on the top side of the panel when looking down at the top view of the panel as illustrated in Figure 1 and the additional female cavity 11 is located along the left hand edge on the bottom side of the panel as illustrated in Figure 2. When two adjacent panels are placed together as illustrated in Figures 7, 8, 9, 10, and 14, the transverse locking mechanism is engaged, creating a barrier against wind-driven rain or water penetration to the substrate using the point between the two panels as a point of ingress.

Still further protection against the elements is built into each panel in the form of a reservoir cavity system, formed from a male functioning part 7 and the recessed water reservoir 3, which cooperate to allow for the draining of any moisture that may penetrate or wick between the end points where the male protrusion 2 contacts a similar male protrusion 2 of an adjacent tile. The male functioning part 7 interlocks into the recessed water reservoir 3 to create a tight bond and positioning mechanism, which assists to keep the ends of to adjacent tiles in tight context and position to each other. The locking of the additional male protrusion 4 and the additional female cavity 11 also facilitate additional alignment and tightness of placement between two adjacent tiles.

Figures 2, 8, 10, and 13 show longitudinal structural protrusions 9 and transverse structural protrusions 10 on the bottom side of the panels which run front to back and side to side similarly to form a structure that allows for contact and support of the panel to the

substrate it is attached to, thereby distributing any weight or forces of pressure that may be imparted to the surface area of the top of any panel and thereby dissipating evenly these pressures caused by either wind or weight by someone walking on the surfaces to the substrate, without causing damage to the integrity of the panel system or the substrate. These structural protrusions 9 and 10 provide strength and integrity to the panels created.

Figure 2, 8, 10, and 13 also show structural cavities 15 created by the structural protrusions 9 and 10, which act as cavities to enhance the isolative qualities of the panel by encapsulating pockets of air which become part of the natural insulation mechanism of the panel. Along with the thermal qualities of the makeup of the materials used in the injection molding of the panels themselves, these air pockets give these panels isolative qualities which assist in the cost savings of heating and air conditioning of units that these panels are used as typical roofing systems in hot or cold climatic areas.

The structural protrusions 9 and 10 which are slightly recessed to allow for movement of the air pockets that are trapped under the panel and thereby form a structure to dissipate any built-up moisture created by moisture vapor that may percolate from the substrate and thereby resist damage caused by moisture in the form of damp rot, fungus or mold which proliferate in areas of dampness.

In addition, Figures 2, 6, 8, 10, and 13 show slots 8 in the bottom surface of the panels to connect the air pockets created in each panel to adjacent panels that they are attached to, thereby making a complete and integrated insulating air blanket under the panel system to alleviate the chance of any moisture of vapor build up under the panel system.

TABLE OF REFERENCES

Element(s)	Reference	Total count	Page and line locations
indicators	1		
male protrusion	2	8	Page 5 line 15 Page 5 line 17 Page 5 line 20 Page 6 line 1 Page 6 line 2 Page 6 line 15 Page 7 line 14 Page 7 line 14
reservoir	3	3	Page 6 line 14 Page 7 line 13 Page 7 line 15
Additional male protrusion	4	4	Page 6 line 15 Page 7 line 2 Page 7 line 4 Page 7 line 17
decorative elements	5	6	Page 4 line 12 Page 4 line 14 Page 4 line 16 Page 4 line 18 Page 4 line 20 Page 5 line 1
gaps	6	1	Page 4 line 14
male functioning part	7	2	Page 7 line 12 Page 7 line 15
slots	8	1	Page 8 line 18
longitudinal structural protrusions	9	1	Page 7 line 20
transverse structural protrusions	10	1	Page 7 line 20
structural protrusions	9 and 10	3	Page 8 line 5 Page 8 line 6 Page 8 line 13
additional female cavity	11	3	Page 7 line 3 Page 7 line 6 Page 7 line 18
female cavity	12	4	Page 5 line 18 Page 5 line 20 Page 6 line 1 Page 6 line 3
frontal faces	13	5	Page 4 line 16 Page 4 line 17 Page 4 line 18 Page 5 line 2 Page 5 line 6
cavity	14	2	Page 5 line 6 Page 5 line 7
structural cavities	15	1	Page 8 line 6
water stop	16	2	Page 6 line 20 Page 6 line 22

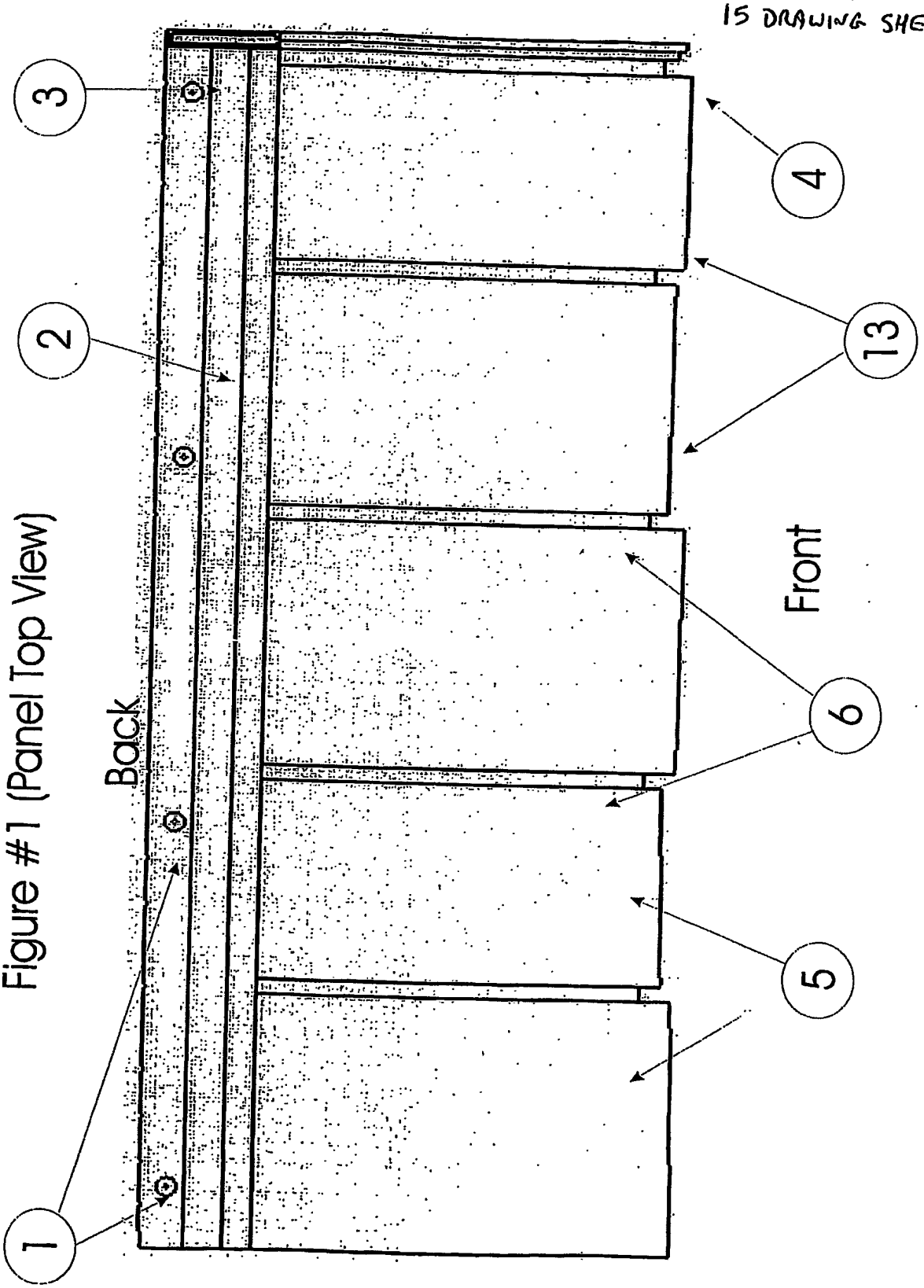


Figure #1 (Panel Top View)

Figure #2 (Panel Bottom View)

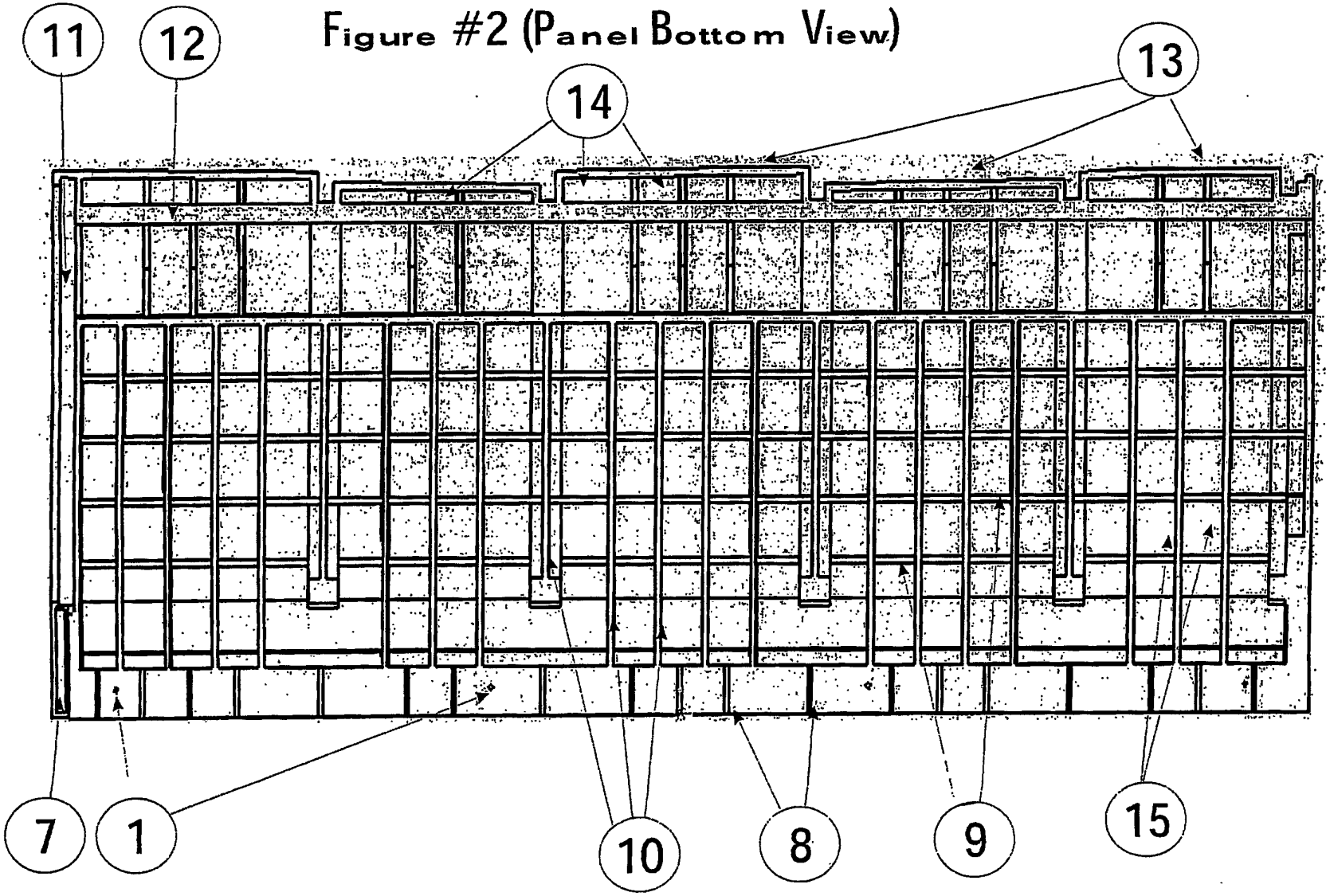


Figure #3 (Top and Bottom Lock Details)

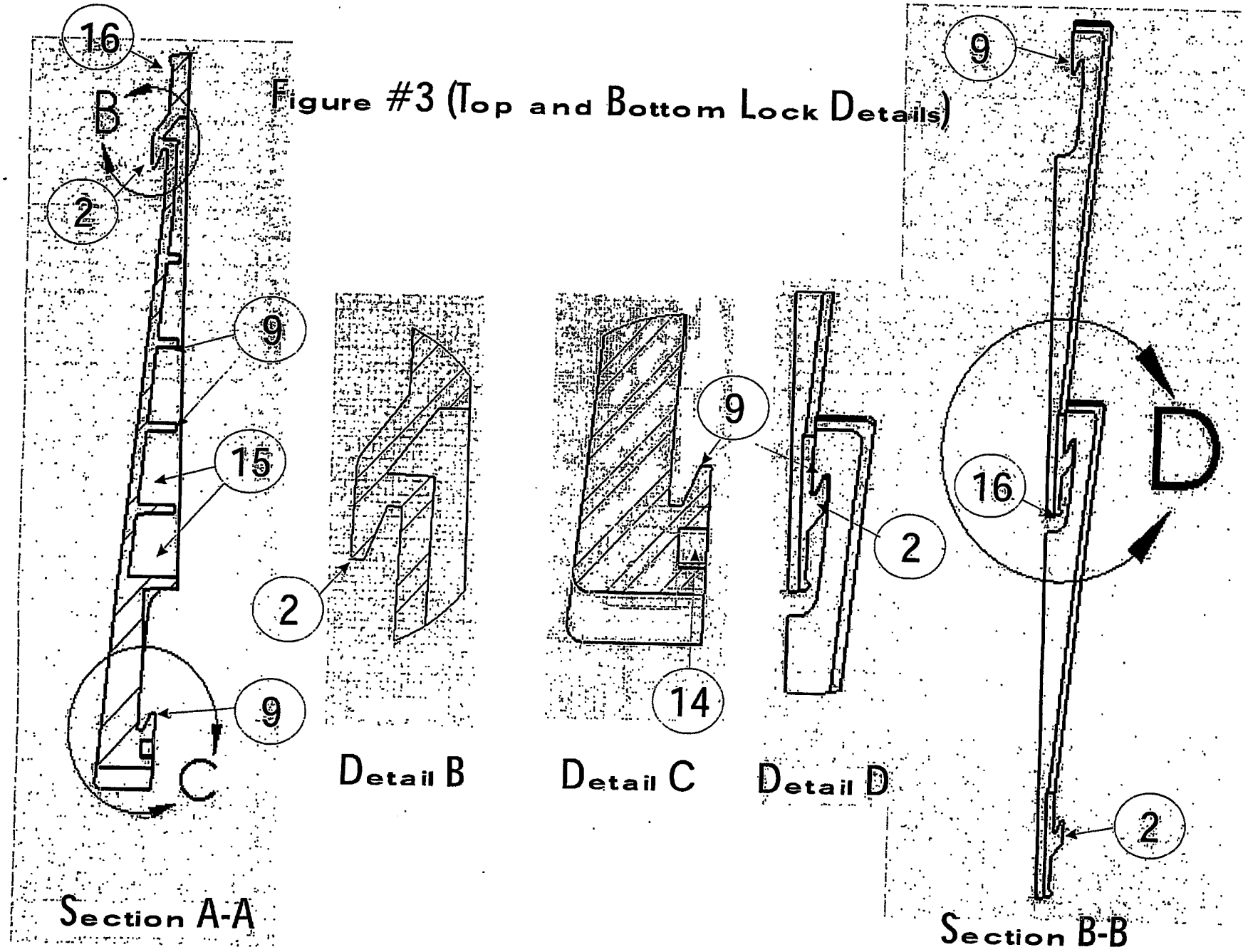


Figure #4 (Panel Front View)

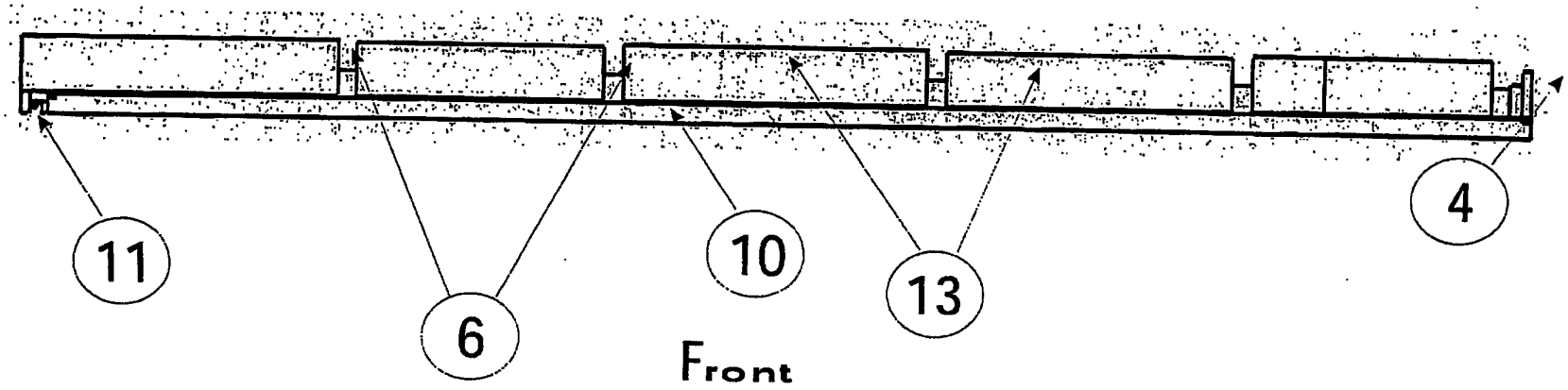


Figure #5 (Panel Edge Lock Details)

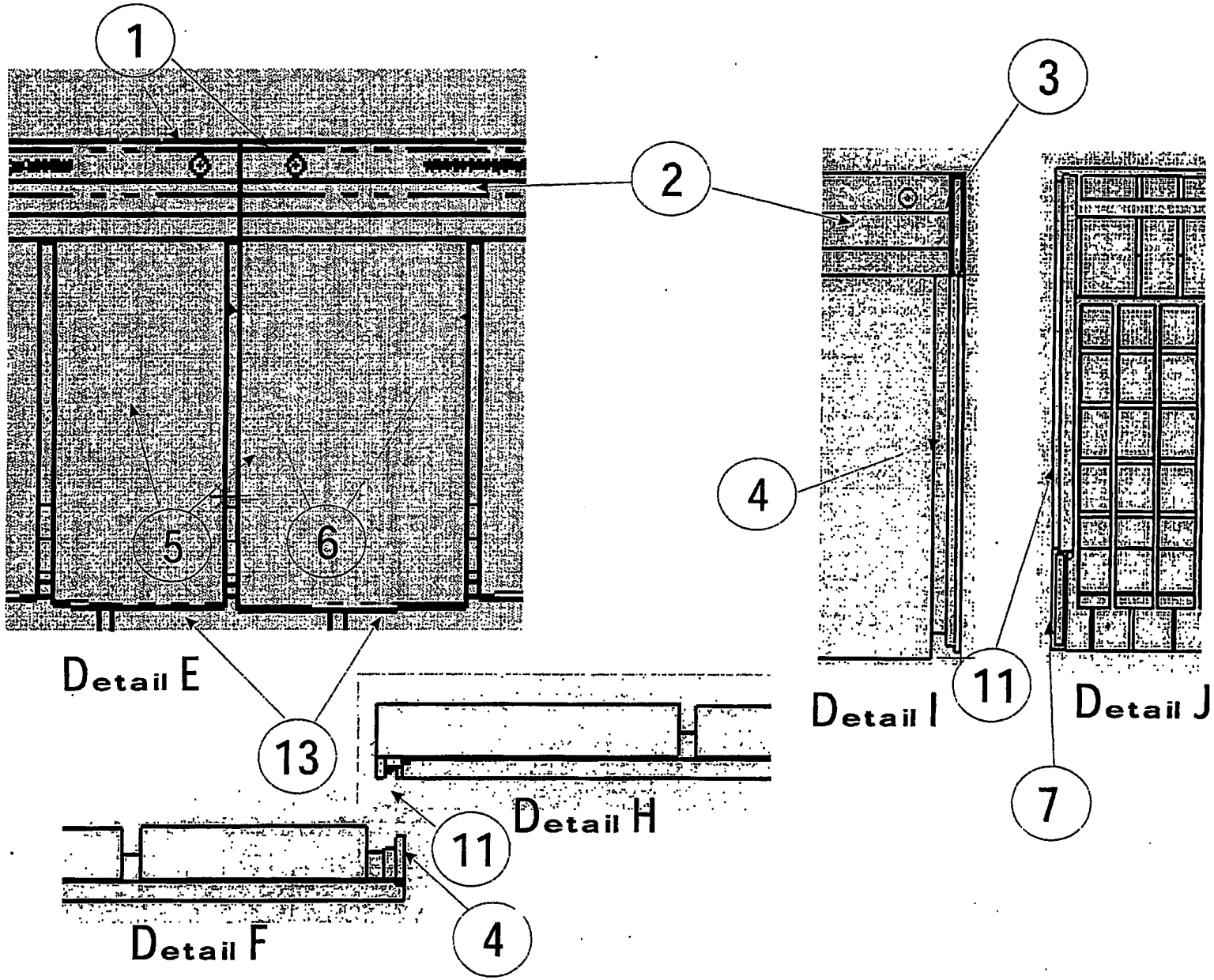


Figure #6 Panel Bottom Front View)

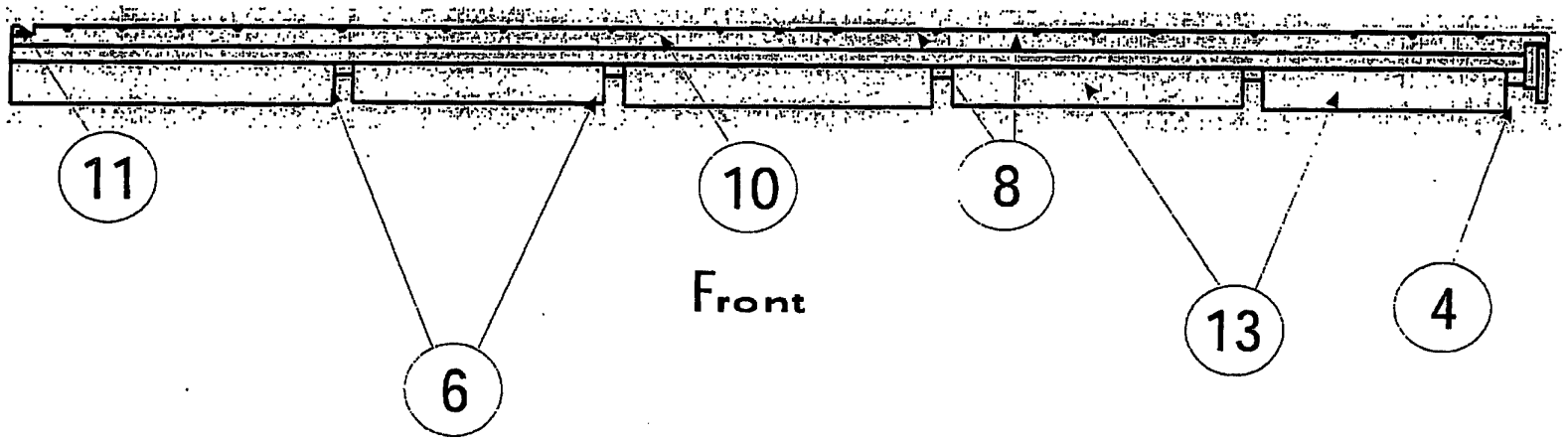


Figure #7 (Panels Top Tri-View)

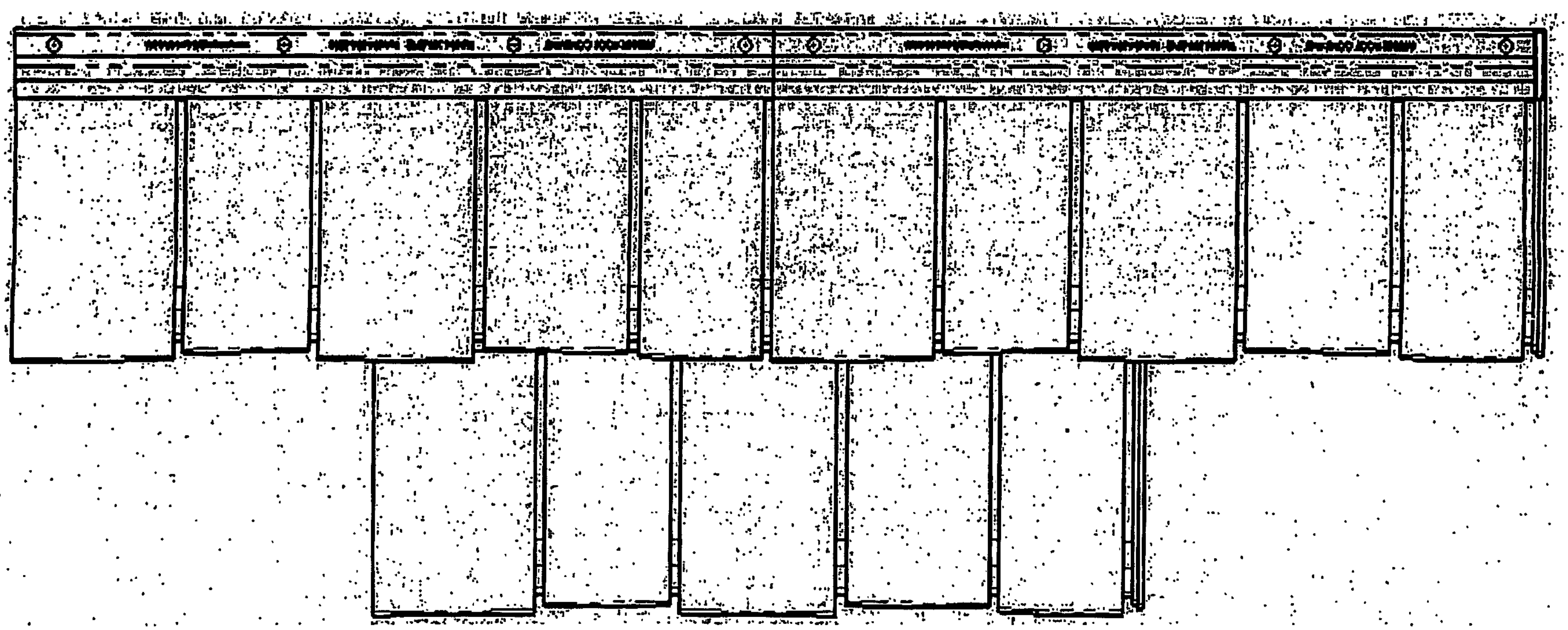


Figure #8 (Panel Bottom Tri-View)

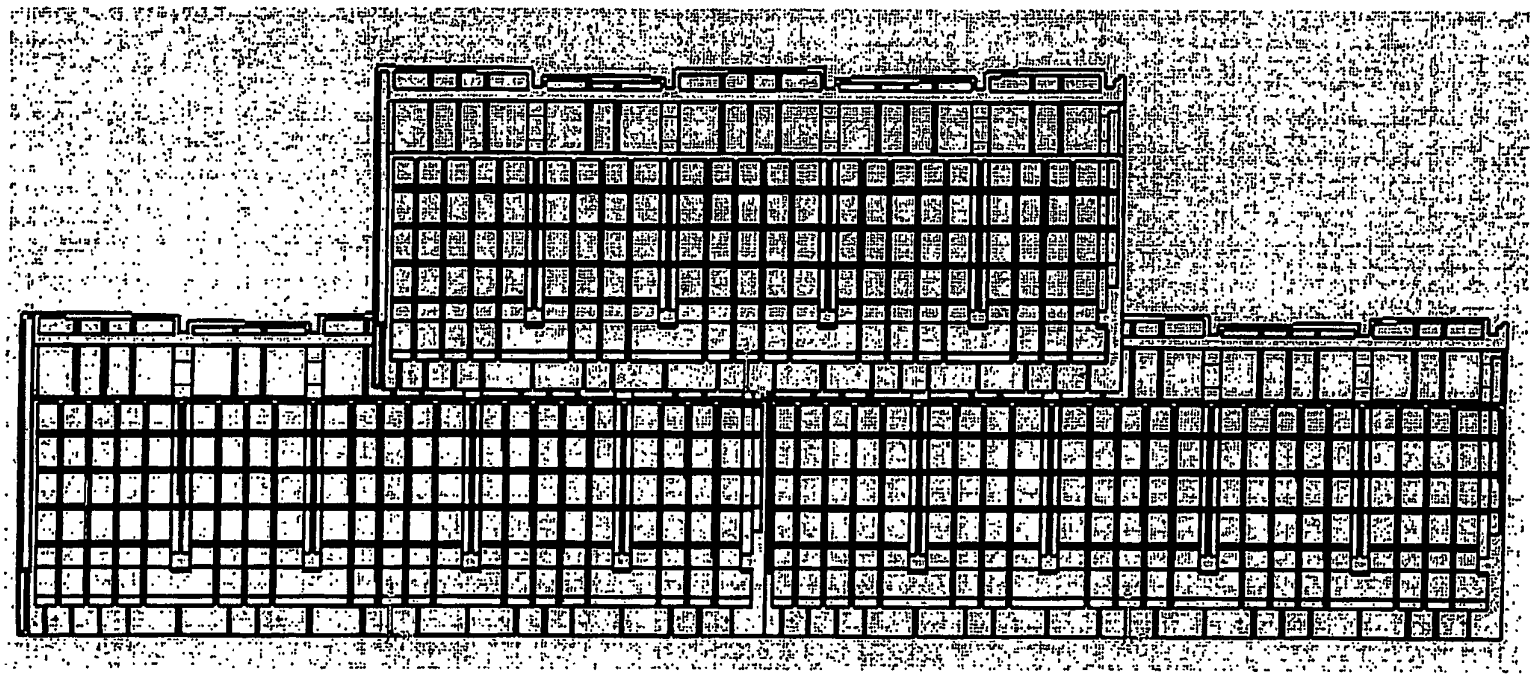


Figure #9 (Panel Top Tri-View Angled)

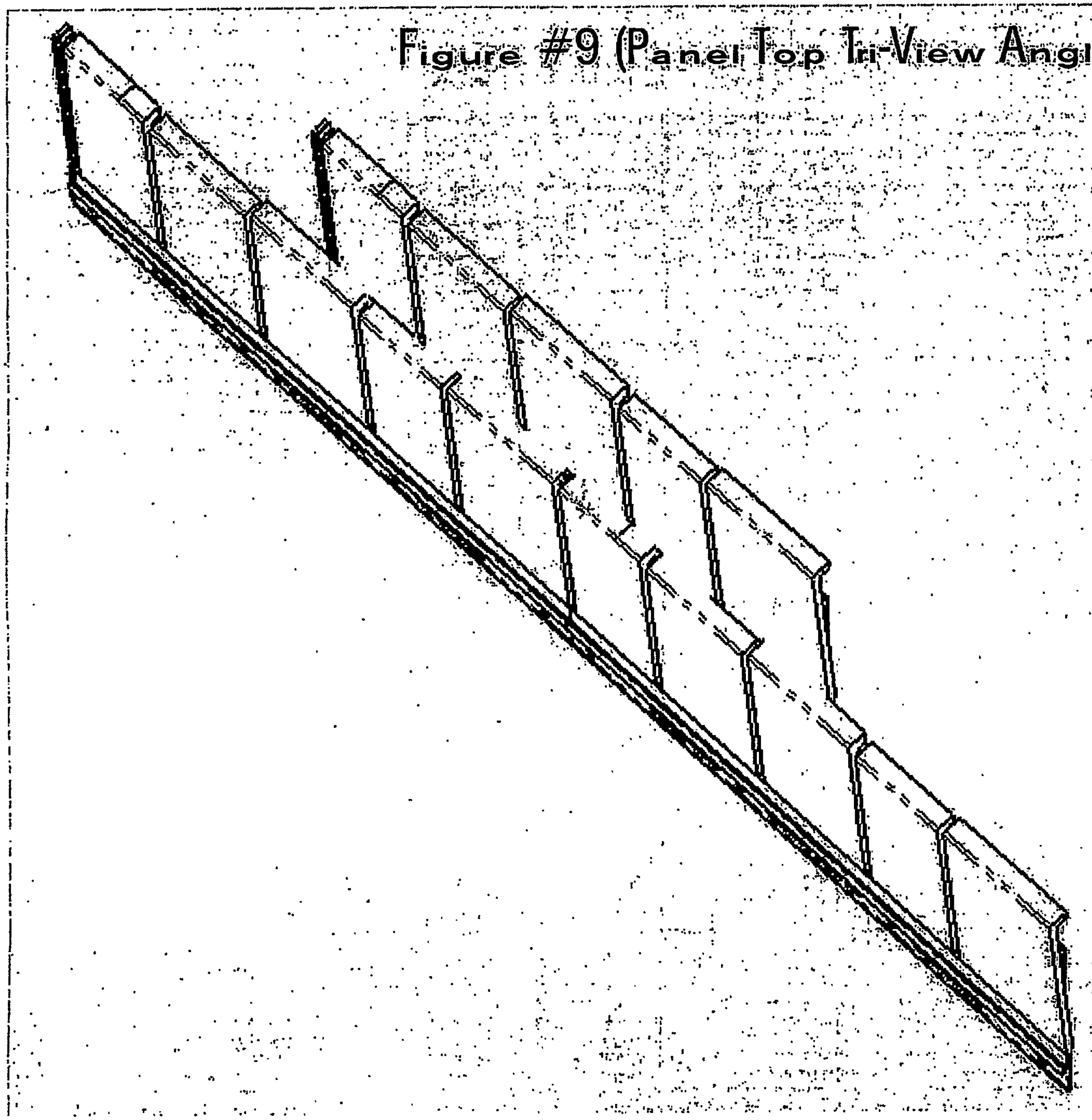


Figure #10 (Panel Bottom Tri-View Angled)

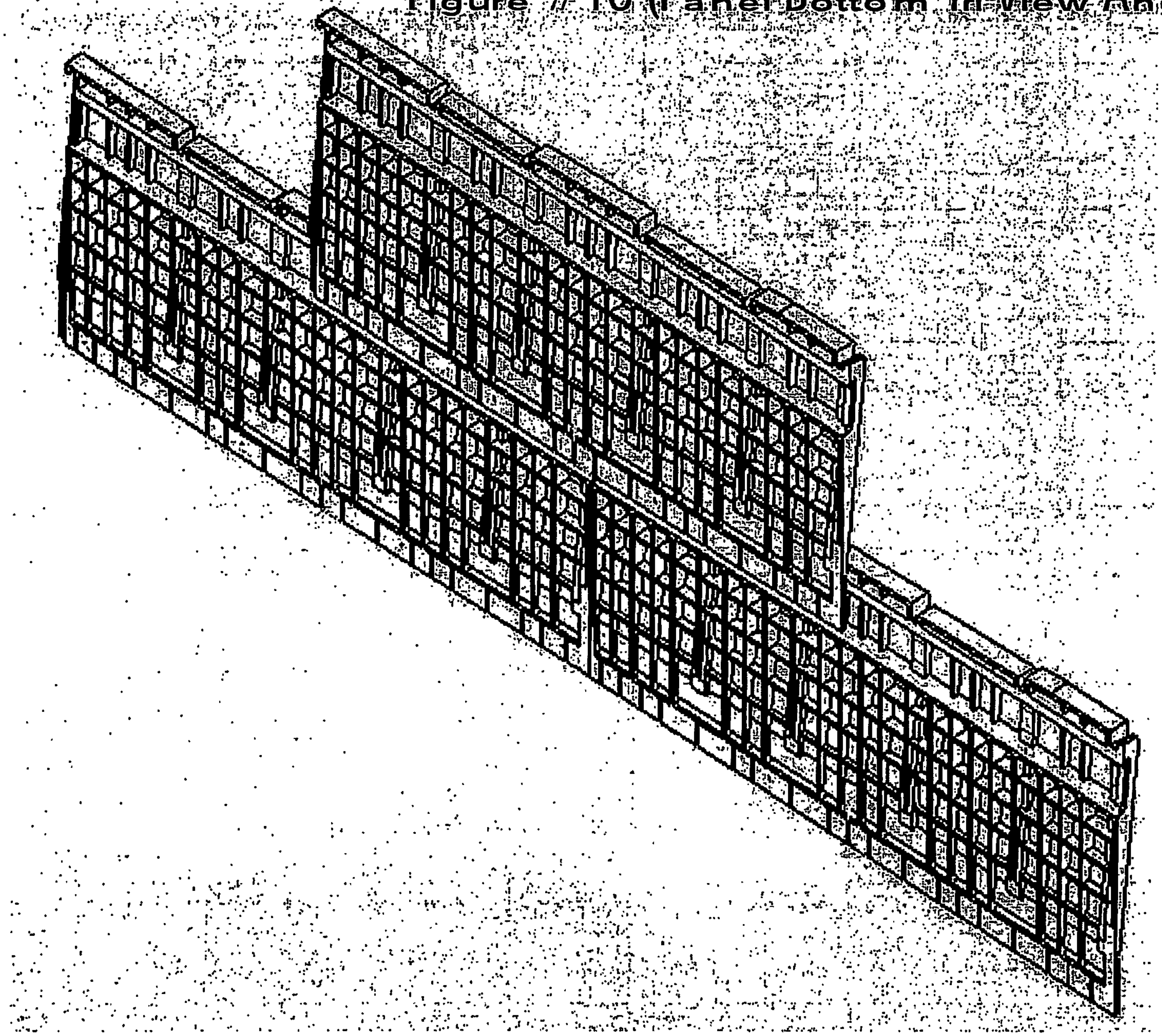


Figure #11 (Panel Top View Shaded)

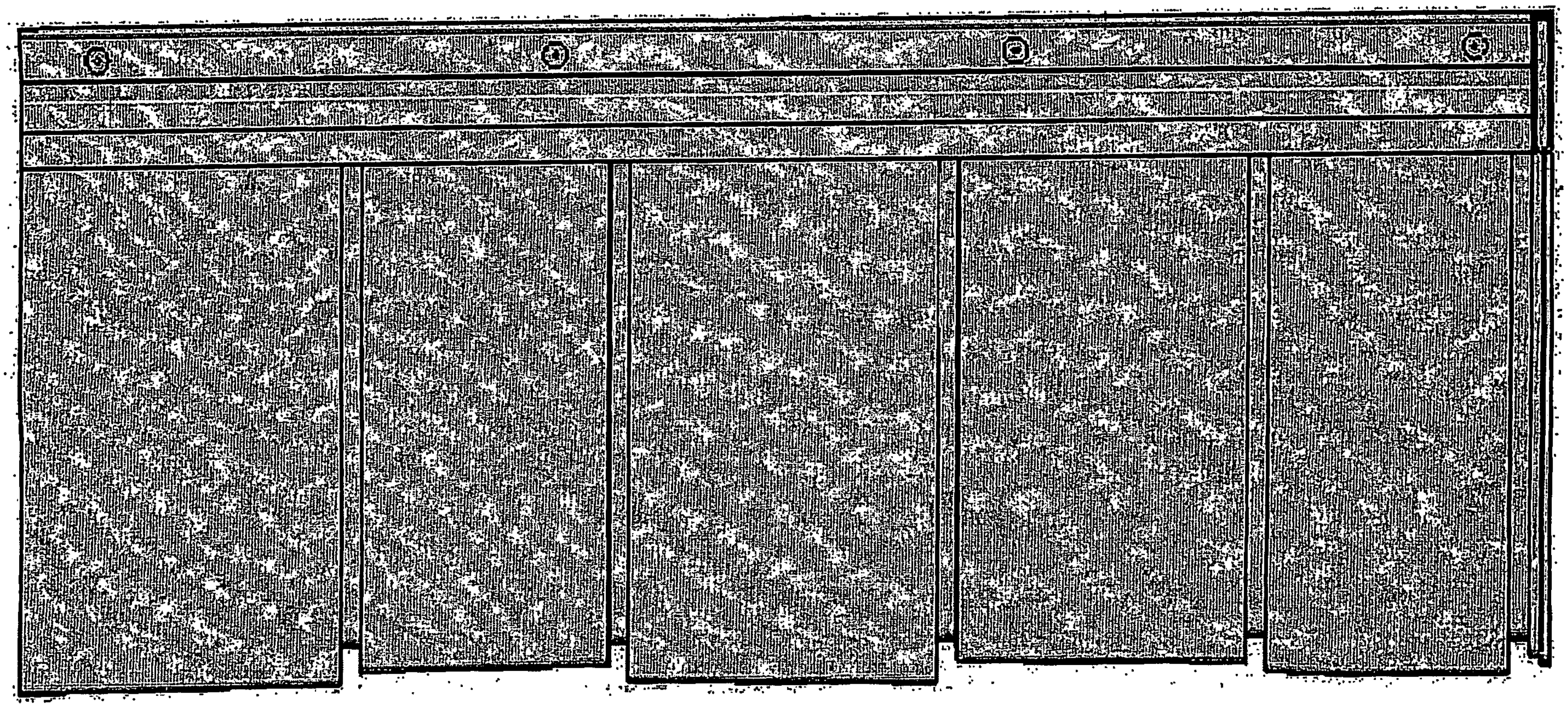


Figure #12 (Panel Front View Shaded)

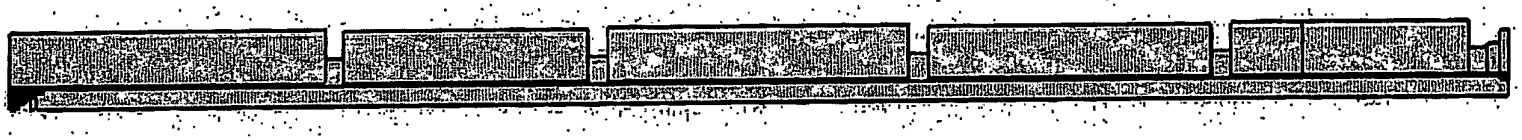


Figure #13 (Panel Bottom View Shaded)

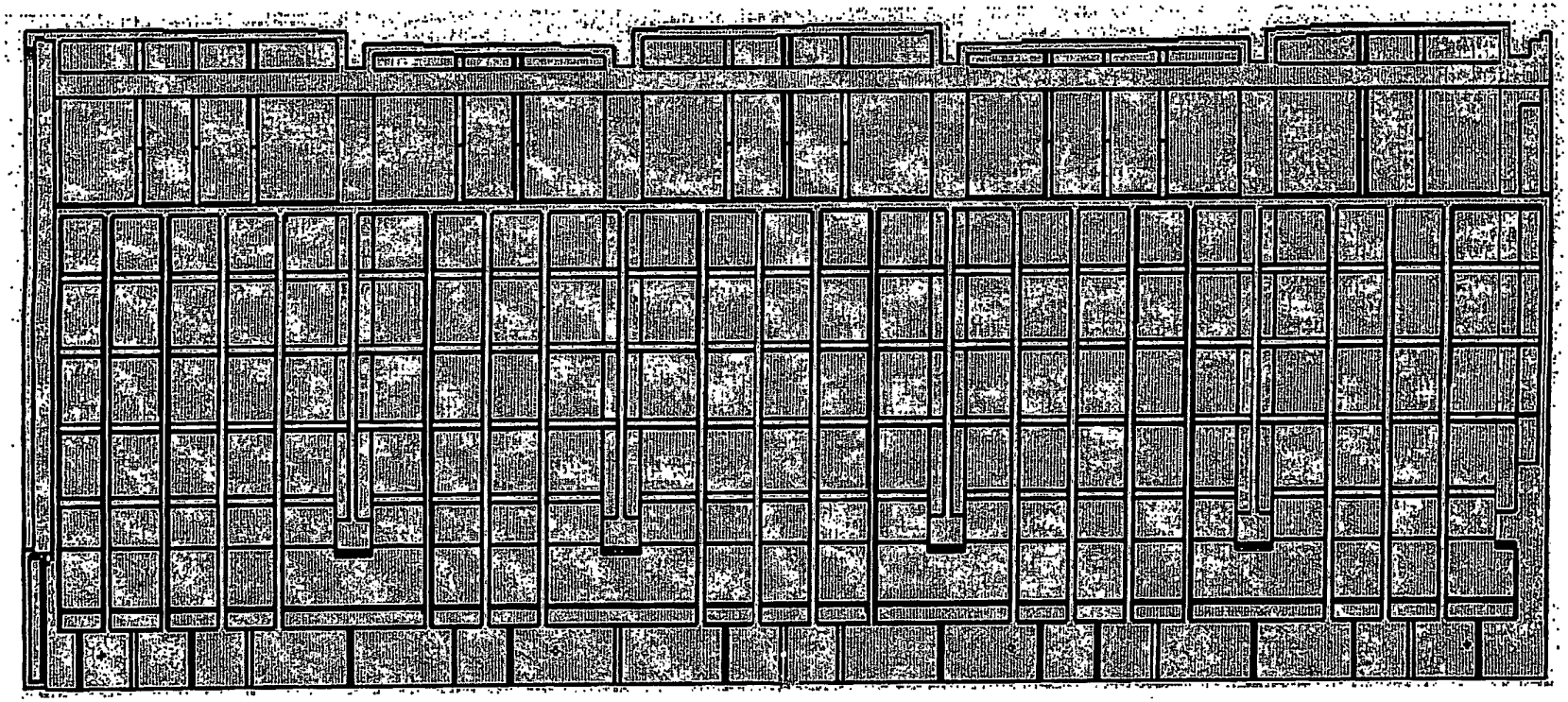


Figure #14 (Panel Top Tri-View Shaded)

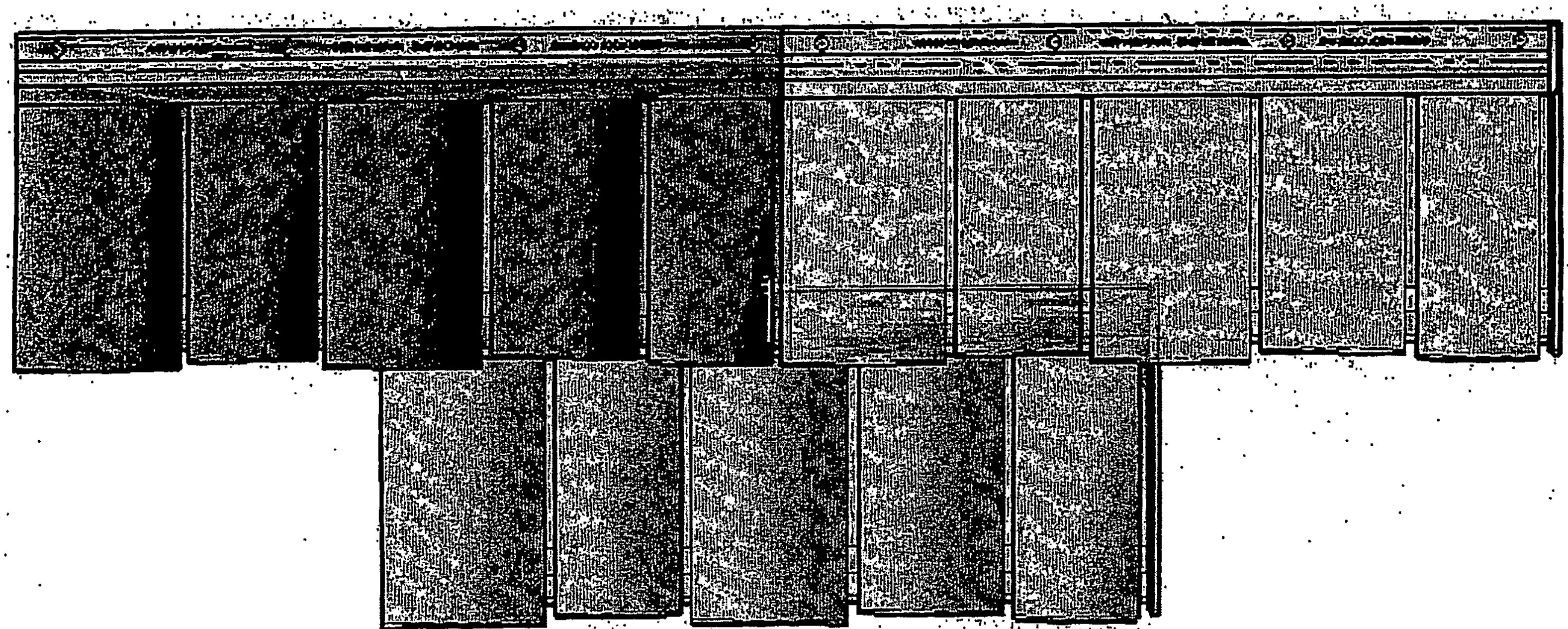
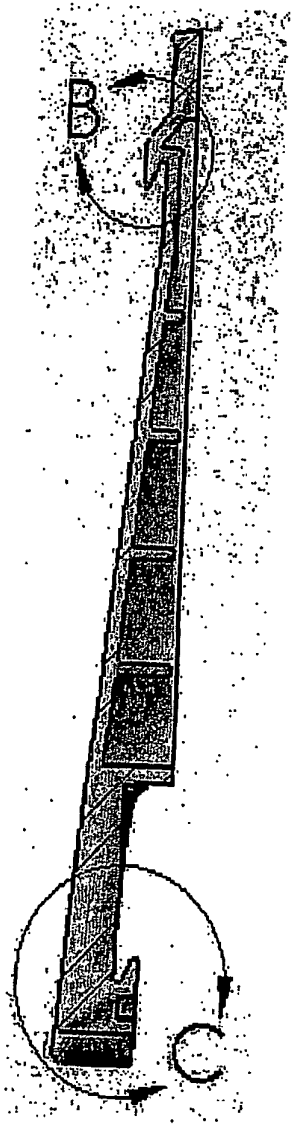
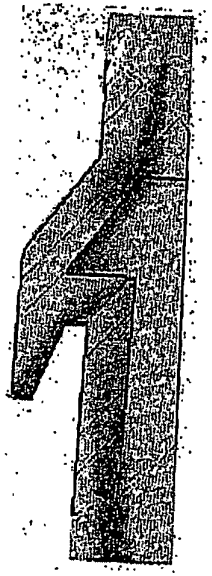


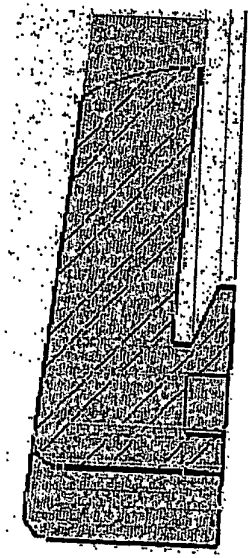
Figure #15 (Top and Bottom Lock Details Shaded)



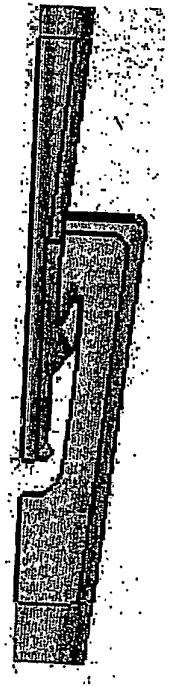
Section A-A



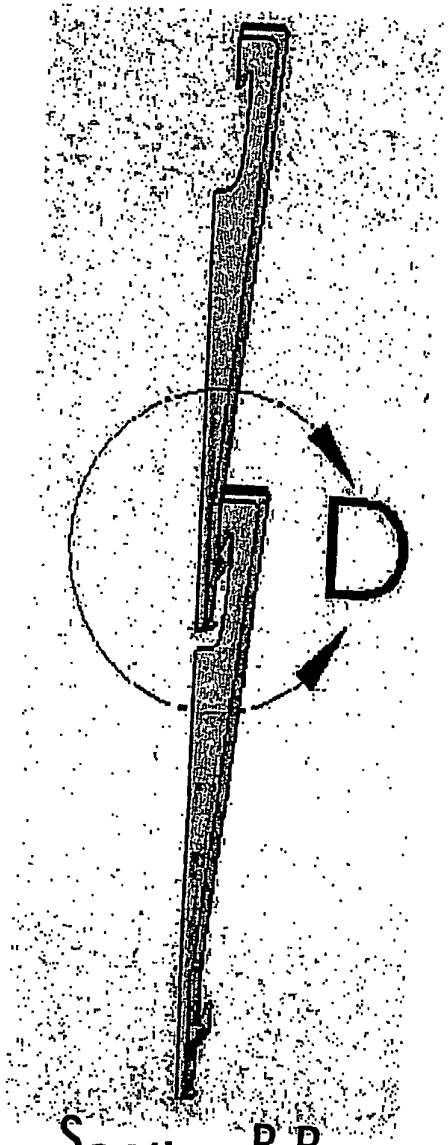
Detail B



Detail C



Detail D



Section B-B